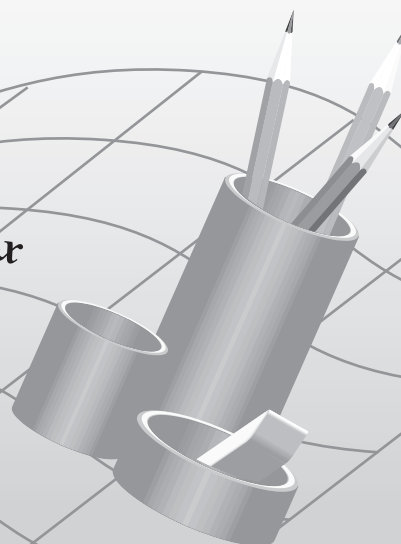
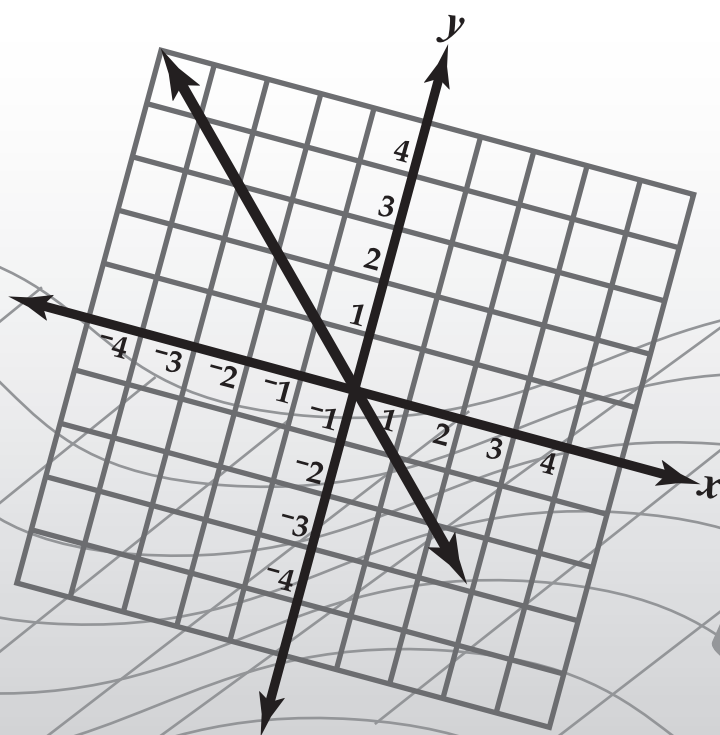
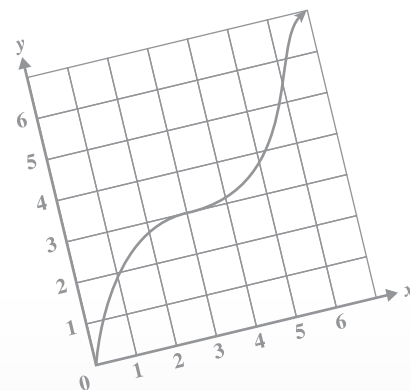




$$2x - 4 = 3(x - 1) - 10$$



# ALGEBRA/ DATA ANALYSIS

Public Release 2008

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## Response Grid Items

Several items in this test require you to enter your answer on a special grid like the one shown below.

					} answer boxes	
	/	/	/			} fraction bars decimal points
.	.	.	.	.		
0	0	0	0	0	} number bubbles	
1	1	1	1	1		
2	2	2	2	2		
3	3	3	3	3		
4	4	4	4	4		
5	5	5	5	5		
6	6	6	6	6		
7	7	7	7	7		
8	8	8	8	8		
9	9	9	9	9		

### Directions for Completing the Response Grids

- Find the answer to the problem.
- Write your answer in the boxes at the top of the grid.
  - You may start your answer at either end of the answer box. Print your answer with the first digit (or symbol) in the left answer box, or with the last digit in the right answer box.
  - Print no more than one digit or symbol in each answer box. Do **not** leave a blank answer box in the middle of an answer.
  - Be sure to write a decimal point or fraction bar in the answer box if it is part of the answer.
- Fill in the appropriate bubble under each box in which you wrote your answer.
  - Fill in only one bubble for each answer box used in your answer. Do **not** fill in a bubble under an unused answer box.
  - You must fill in the bubbles accurately to receive credit for your answer.



## Examples of Valid Responses

The Response Grids below show valid ways to enter an answer of  $\frac{3}{2}$ .

		3	/	2
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

3	/	2		
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

1	.	5		
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

1	.	5	0
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

## Special Directions for Mixed Numbers, Decimals, Negative Numbers, and Percents

- Mixed numbers must be entered as decimals or improper fractions. For example, an answer of  $1\frac{1}{2}$  should be entered as 1.5 or  $\frac{3}{2}$ .
- Decimal answers should be entered as accurately as possible unless otherwise indicated in the problem. Some answers may need to be rounded in order to fit in the Response Grid space.
- No Response Grid items have negative answers.
- Percents must be entered as decimals or fractions. For example, an answer of 50% should be entered as .5 or  $\frac{1}{2}$ .

**D**irections

Use the Response Grid in the Answer Book to complete Sample A.

**Sample A**

Diana earned the scores below on her science tests.

79, 98, 85, 91

What is the mean of these scores?

**Sample B**

Look at the pattern below.

0, 2, 4, 6, 8, . . .

If the pattern continues, what will be the next term?

A 2

B 8

C 10

D 14

**Sample C**

The sum of the angles of a triangle is 180 degrees. The measures of two angles of a triangle are  $x$  and  $3x$ . Which of these expressions represents the measure of the third angle?

F  $180 + x + 3x$

G  $180 - x + 3x$

H  $180 - x - 3x$

J  $180 + x - 3x$





- 1** Look at the pattern below.

324, 108, 36, 12, . . .

If this pattern continues, what is the next term?

- A 6
- B 4
- C 3
- D 1

- 2** Richard surveys a room of 26 adults and finds that of the 12 men, 5 are married and 7 are single. Of the 14 women, 8 are married and 6 are single. Richard randomly assigns each person a number and places a card with each number in a hat. What is the probability that Richard will select a card with a number assigned to a married man?

- F  $\frac{5}{26}$
- G  $\frac{8}{26}$
- H  $\frac{12}{26}$
- J  $\frac{13}{26}$





3

Mr. Smith's pool is filled with water to a height of 48 inches. It has developed a slow leak. At the end of the first day, after the leak started, the height of the water decreased by 0.5 inches. If this rate continues, which of these tables represents the height of the water at the end of the second, fifth, and seventh day?

A WATER LEVEL

End of Day	Height of Water (in inches)
2	49.0
5	50.5
7	51.5

C WATER LEVEL

End of Day	Height of Water (in inches)
2	58
5	73
7	83

B WATER LEVEL

End of Day	Height of Water (in inches)
2	47.0
5	45.5
7	44.5

D WATER LEVEL

End of Day	Height of Water (in inches)
2	38
5	23
7	13



- 4** Look at the system of equations below.

$$12x - 4y = 8$$

$$3x - y = 2$$

Which of these statements describes the graph of this system of equations?

- F the same line
- G two parallel lines
- H two lines that intersect only at  $(1, 1)$
- J two lines that intersect only at  $(0, -2)$

- 5** In a class of 15 students, each student has a different test score. The median test score is 79. How many students scored higher than 79?

- A 6
- B 7
- C 8
- D 9

- 6** Kaila and Joey are starting a lawn mowing company. They have to buy a lawn mower for \$250. They will charge \$15 per lawn. Which of these inequalities represents the number of lawns ( $l$ ) that they need to mow to earn at least \$800 after they pay for the lawn mower?

- F  $l \leq 54$
- G  $l \geq 54$
- H  $l \leq 70$
- J  $l \geq 70$





**7** Jeremy plays soccer. He scores a goal in 40% of his games. Jeremy wants to design a simulation using a spinner to predict the probability that he will score a goal in 8 out of 10 games. Which simulation design has an appropriate device and a correct trial?

- A Divide a spinner into 5 equal sections labeled 1, 2, 3, 4, and 5. Spin the spinner 8 times.
- B Divide a spinner into 5 equal sections labeled 1, 2, 3, 4, and 5. Spin the spinner 10 times.
- C Divide a spinner into 4 equal sections labeled 1, 2, 3, and 4. Spin the spinner 8 times.
- D Divide a spinner into 4 equal sections labeled 1, 2, 3, and 4. Spin the spinner 10 times.

**8**

**ECR**

Ichiro plans to spend no more than a total of \$60 for both lunch and dinner each day during his vacation.

Complete the following in the Answer Book:

- Write an inequality that models this relationship. Let  $x$  represent the amount, in dollars, that Ichiro spends on lunch. Let  $y$  represent the amount, in dollars, that Ichiro spends on dinner.
- Graph the inequality on the grid provided in the Answer Book.
- On Thursday, Ichiro spent exactly \$60 on lunch and dinner. He spent three times as much on dinner as he spent on lunch. How much did Ichiro spend on lunch? How much did Ichiro spend on dinner? Use mathematics to explain how you determined your answers. Use words, symbols, or both in your explanations.



# Directions

Use the Response Grids in the Answer Book to complete Numbers 9 through 11.

- 9** The table below shows a relationship between  $x$  and  $y$ .

$x$	1	2	3	4
$y$	2	5	10	17

What is the value of  $y$  when  $x$  is 10?

- 10** Bailey decorates a dance hall with balloons. A box of balloons contains 20 red, 18 blue, and 12 white balloons. Bailey randomly chooses a balloon without looking. What is the probability that he chooses a blue or a white balloon?

- 11** A car rental company has 2 rental plans. Plan A charges \$49.00 per day. Plan B charges \$25.00 per day, plus \$0.10 per mile. How many miles must Teri drive in one day for Plan A to cost the same as Plan B?



- 12** The following formula can be used to find the wind-chill temperature ( $w$ ) when the wind speed is 20 miles per hour.

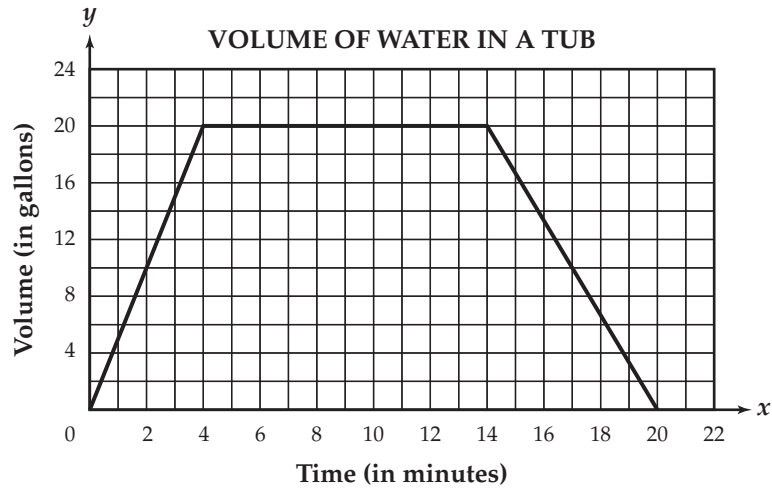
$$w = -39 + \frac{3}{2}t \quad (t = \text{actual air temperature})$$

Which of these is the actual air temperature if the wind-chill temperature is  $-12^\circ$ ?

- F  $-57^\circ$
- G  $-21^\circ$
- H  $18^\circ$
- J  $41^\circ$



- 13** The graph below models the relationship between time, in minutes, and the volume of water, in gallons, in a tub.



What is the rate, in gallons per minute, at which the tub is being filled?

- A 4 gallons per minute
- B 5 gallons per minute
- C 14 gallons per minute
- D 20 gallons per minute



**14**  
**ECR**

Jared wants to rent a carpet cleaner. The table below shows the cost of renting a carpet cleaner.

CARPET CLEANER RENTAL

Number of Hours	Cost
1	\$16
2	\$22
3	\$28
4	\$34
5	?
6	?

Complete the following in the Answer Book:

- Complete the table to show the cost of renting a carpet cleaner for 5 and 6 hours if this pattern continues.
- Write an equation to represent the relationship between the cost of renting a carpet cleaner and the number of hours that a carpet cleaner is rented.
- If Jared has \$60, can he rent the carpet cleaner for 9 hours? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
- The store also sells the same carpet cleaner for \$165, including tax. What is the maximum number of hours that the cost of renting the carpet cleaner is less than the cost of buying the carpet cleaner? Use mathematics to justify your answer.



- 15** The table below shows a company's annual income over 5 years. The equation  $y = 100,000(2)^x$  describes the curve of best fit for the company's annual income ( $y$ ). Let  $x$  represent the number of years since 1996.

ANNUAL INCOME

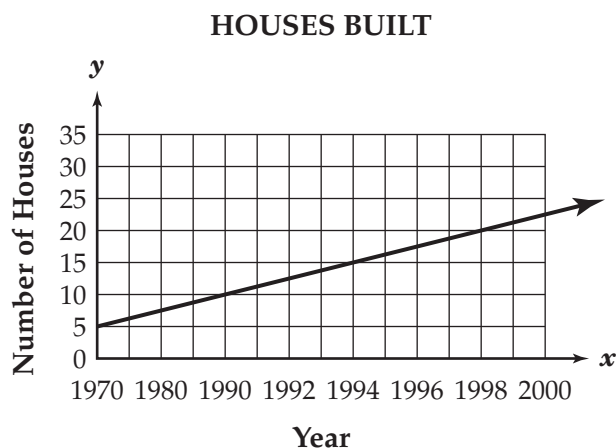
Year	Income
1996	\$105,000
1997	\$200,000
1998	\$396,000
1999	\$801,000
2000	\$1,598,000

Using this equation, what would be the company's annual income in the year 2003?

- A \$3,200,000
- B \$4,000,000
- C \$6,400,000
- D \$12,800,000



- 16** The graph below shows the number of new houses built in a town from 1970 to 2000.



The mayor of the town used the graph to claim that between 1970 and 2000 the number of new houses built increased at a constant rate. Is the claim valid?

- F** It is valid because the graph shows a constant rate of change.
- G** It is valid because 30 years is long enough to evaluate the increase.
- H** It is not valid because the scale on the vertical axis is inappropriate.
- J** It is not valid because the scale on the horizontal axis is inappropriate.



- 17** Ms. Thaler’s class conducted a simulation using a random number generator to predict how many goals a hockey team will score per game next year. The table below shows how she assigned the digits.

**RANDOM DIGIT ASSIGNMENT**

Number of Goals per Game	Digits
0 – 1	0, 1, 2
2 – 4	3, 4, 5, 6, 7
5 or more	8, 9

The class conducted 30 trials. The results of the simulation are shown below.

5 6 7 7 9    8 9 0 4 8    5 3 2 9 5    8 0 8 3 8    9 1 0 6 4    2 2 6 1 4

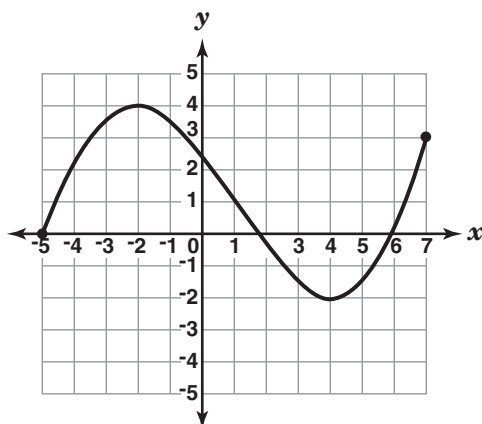
The hockey team will play 90 games next year. Based on this simulation, in how many games will the hockey team score 0 – 1 goals?

- A    24
- B    27
- C    30
- D    39





- 18** Look at the function that is graphed below.



What is the range of this function?

- F**  $-5 \leq y \leq 7$   
**G**  $-5 \leq y \leq 3$   
**H**  $-2 \leq y \leq 3$   
**J**  $-2 \leq y \leq 4$



**No test material on this page**



# *Session* **2**



- 19** Marina has \$20 in a savings account. She wants to deposit \$10 each week for  $x$  weeks into her savings account. If she does not withdraw any money, which expression below represents the total amount of money, in dollars, she will have in her savings account in  $x$  weeks?

- A  $10(20 + x)$
- B  $x(10 + 20)$
- C  $10x + 20$
- D  $20x + 10$

- 20** The table below shows a relationship between  $x$  and  $y$ .

$x$	-2	-1	0	1	2
$y$	7	4	1	-2	-5

What is the value of  $y$  when  $x$  is 7?

- F -21
- G -20
- H -11
- J -2





- 21** Sean's movie rental company charges a monthly fee of \$5.00 plus an additional cost of \$1.25 per movie rental. Which of these equations represents the total monthly cost ( $c$ ) of renting  $x$  movies?

- A  $c = 1.25x + 5.00$   
B  $c = 3.75x + 5.00$   
C  $c = 5.00x + 1.25$   
D  $c = 5.00x + 3.75$

- 22** Nineteen families live in a small town. The income for each family is listed in the table below.  
**BCR**

FAMILY INCOME

Income	Number of Families
\$35,000	5
\$40,000	5
\$45,000	4
\$50,000	4
\$320,000	1

Complete the following in the Answer Book:

- What are the median and mean family incomes for this small town?
- Should the mean or median be used to describe the typical family income in this small town? Use mathematics to justify your answer.
- If each family's income increases by \$1,000, Alison believes the mean family income will increase more than the median family income. Do you agree with Alison? Use mathematics to justify your answer.

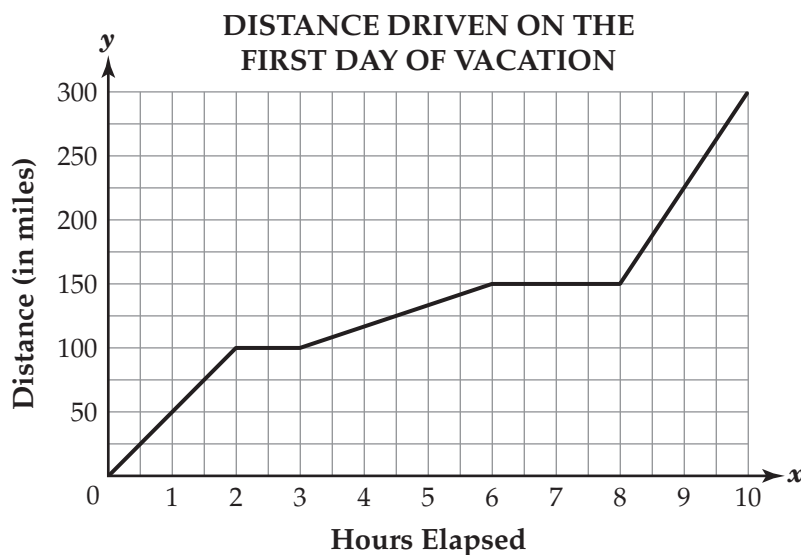




- 23** William charges \$4 per hour to babysit. LaRhonda charges \$10, plus an additional \$2 per hour to babysit. Both William and LaRhonda work the same number of hours. After how many hours will they earn the same amount of money?

A 2 hours  
B 2.5 hours  
C 4.5 hours  
D 5 hours

- 24** The graph below shows the distance, in miles, that the Campbell family drives on the first day of their vacation.



What is the total number of hours that the Campbell family stopped during the first day?

F 2 hours  
G 3 hours  
H 4 hours  
J 5 hours





**25** There are 826 deer in an enclosed animal park. Scientists capture, tag, and release 60 deer. A week later, the scientists capture 100 deer. How many deer should the scientists expect to have tags? Round the answer to the nearest whole number.

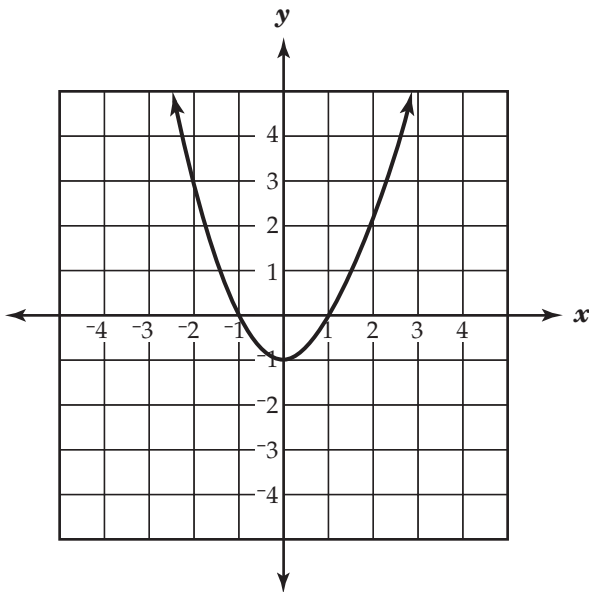
- A 5
- B 7
- C 8
- D 14



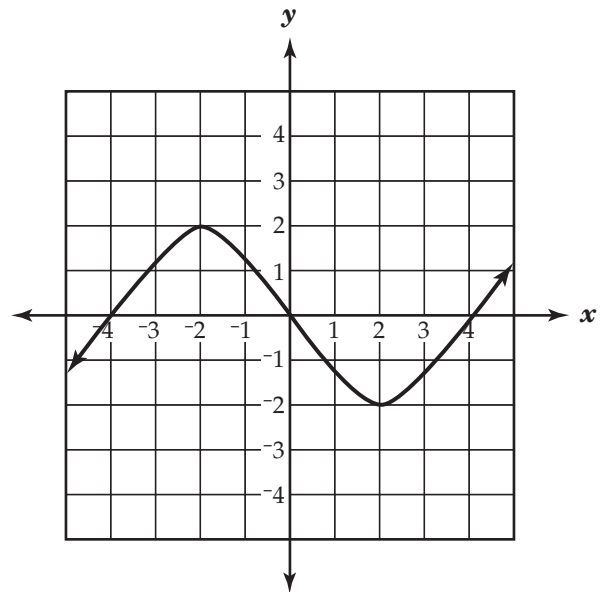


**26** Which function graphed below is not continuous?

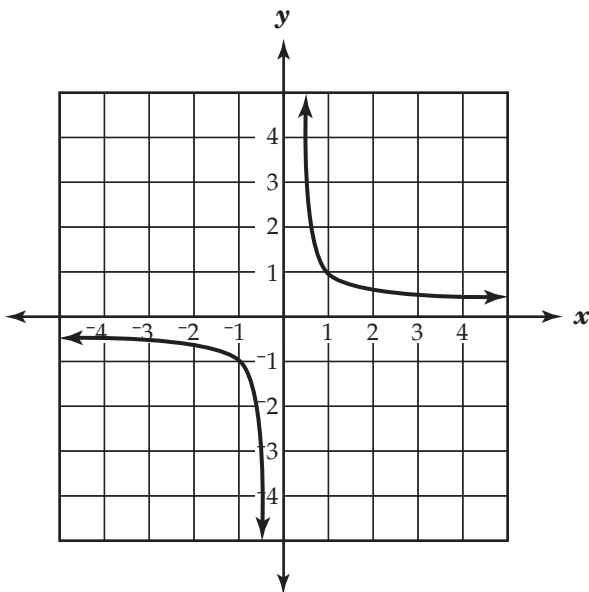
F



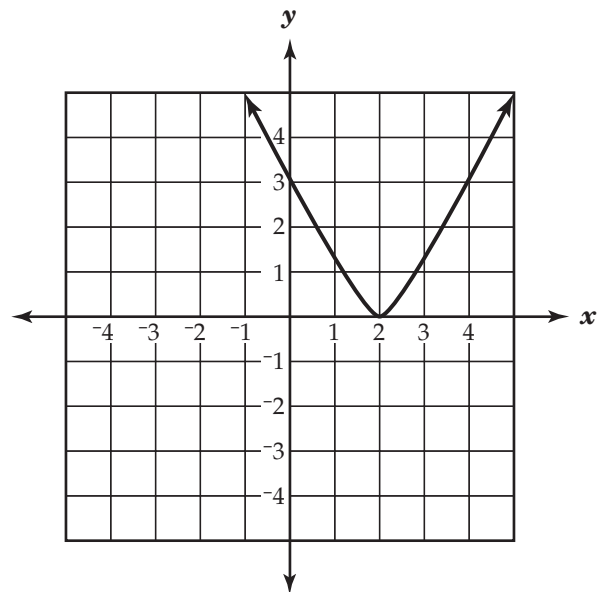
H



G



J





**27****BCR**

The president of the student government wants to survey the students in the school about their satisfaction with the 36 after-school activities. There are 1,000 students in the school—200 freshmen, 200 sophomores, 300 juniors, and 300 seniors. The president suggested three different sampling methods.

**Method A:** Randomly choose three students from each of the 36 after-school activities for the survey.

**Method B:** Randomly select 100 students from the honor roll list to survey.

**Method C:** Randomly select 20 freshmen, 20 sophomores, 30 juniors, and 30 seniors for the survey.

Complete the following in the Answer Book:

- Which method provides the most representative sample of the student population? Use mathematics to justify your answer.
- Use mathematics to justify why each of the other two methods does not provide a representative sample.



**D**irections

Use the Response Grids in the Answer Book to complete Numbers 28 through 30.

- 28** José conducted a survey of 30 people to determine how many times a person ate at a restaurant between January and July. The results are shown in the stem-and-leaf plot below.

SURVEY RESULTS

0	1 6 8 9 9
1	0 1 2 5 6 7 9 9
2	0 3 4 6
3	4 4 5 5 5 7 8
4	3 3 3 6 7
5	
6	3

Key
$2 0 = 20$

Based on the survey results, what is the probability of randomly selecting a person who ate at a restaurant 20 or more times between January and July?

- 29** For a party, Simon has pizza delivered to his home. Pizza House charges \$8 per pizza plus an additional \$12 for delivery. Spaghetti World charges \$10 per pizza with no delivery charge. If Simon orders the same number of pizzas from each store, how many pizzas must be delivered for the total cost to be the same for Pizza House and Spaghetti World?





- 30** Brooke and Josh each took a two-day road trip. The matrix below shows their average speeds, in miles per hour, for each day that they traveled.

AVERAGE SPEED (mph)		
	Day 1	Day 2
Brooke	61	46
Josh	54	56

If they each traveled 6 hours per day, what is the longest distance, in miles, traveled by either Josh or Brooke in a single day?



**31****ECR**

The table below shows the population of a small town from 1960 to 1990.

POPULATION OF A  
SMALL TOWN

Year	Population
1960	5,063
1970	6,244
1980	7,840
1990	9,179

Complete the following in the Answer Book:

- Write an equation for a line of best fit. Let  $x$  represent the years since 1960. Let  $y$  represent the population of the town. (If you choose to draw a graph to help you write the equation, use the grid provided in the Answer Book.)
- What is the slope of your equation? What does the slope represent in the context of this problem?
- Using your equation, estimate the population in the year 1995. Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
- Is your equation a good model to predict the population of this town in the year 2025? Use mathematics to justify your answer.





- 32** The table below shows a relationship between  $x$  and  $y$ .

$x$	$y$
2	5
3	7
4	9
5	11

Which of these equations represents this relationship?

F  $y = x + 3$

G  $y = x + 4$

H  $y = 2x + 1$

J  $y = 2x - 1$





- 33** The matrices below show the sales information for 3 different Fast Food Unlimited stores over a 2-week period. The district manager will present an award to the store with the single highest-selling item over this 2-week period.

## FAST FOOD UNLIMITED SALES

WEEK 1				WEEK 2			
	Store A	Store B	Store C		Store A	Store B	Store C
Hamburgers	355	324	310	Hamburgers	497	445	360
Hot dogs	445	302	384	Hot dogs	350	498	485
Grilled chicken	361	495	305	Grilled chicken	308	322	440

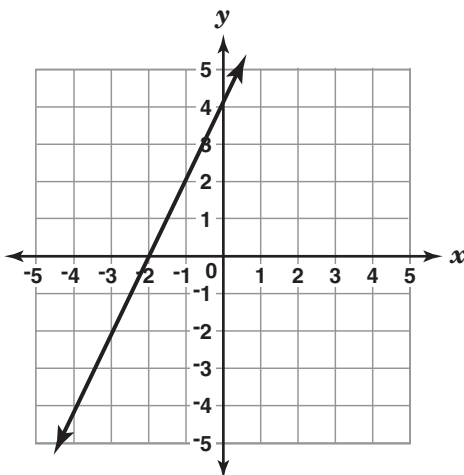
Using the matrices above, determine which store received the award and for which highest-selling item.

- A Store A for hamburgers
- B Store B for grilled chicken
- C Store B for hot dogs
- D Store C for hot dogs





- 34** Look at the function that is graphed below.



Which of these equations represents this function?

F  $y = \frac{1}{2}x - 4$

G  $y = \frac{1}{2}x + 2$

H  $y = 2x - 2$

J  $y = 2x + 4$





**35** The yearbook club washes cars to raise at least \$600. The club charges \$3 for each car ( $c$ ) that they wash. Which of these inequalities models this situation?

A  $3c \leq 600$

B  $3c < 600$

C  $3c \geq 600$

D  $3c > 600$

**36** Three students sold pizzas to raise money. Dwayne sold  $x$  pizzas. Tamara sold  $x + 20$  pizzas. Rueben sold  $3(x + 20)$  pizzas. Which of these expressions represents the total number of pizzas that all three students sold?

F  $x(x + 20) \cdot 3(x + 20)$

G  $x + (x + 20) + 3(x + 20)$

H  $\frac{x(x + 20) + 3(x + 20)}{3}$

J  $\frac{x + (x + 20) + 3(x + 20)}{3}$







- 37** The table below shows the average life span of United States currency.

**LIFE SPAN OF UNITED STATES CURRENCY**

Type of Currency	\$1	\$5	\$10	\$20	\$50	\$100
Average Life Span (in years)	1.5	2	3	4	9	9

According to the data, which of these conclusions can be made about the life span of United States currency?

- A The mode is 9 years.
- B The range is 7 years.
- C The mean is 4 years.
- D The median is 3 years.





# **ALGEBRA/DATA ANALYSIS**

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